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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,010	04/08/2004	Xuming Xiong	1014-SP215-US	9314

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LARSON NEWMAN ABEL & POLANSKY, LLP
5914 WEST COURTYARD DRIVE
SUITE 200
AUSTIN, TX 78730

EXAMINER

VIJAYAKUMAR, KALLAMBELLA M

ART UNIT	PAPER NUMBER
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1793

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/821,010	Applicant(s) XIONG ET AL.	
	Examiner KALLAMBELLA VIJAYAKUMAR	Art Unit 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 27 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-102 is/are pending in the application.
- 4a) Of the above claim(s) 89-102 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-88 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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DETAILED ACTION

- 1-88 are being prosecuted. Claims 89-102 are withdrawn from further consideration. Claims 39-40, 52-53, 64-66 and 83-84 were amended.
- Acknowledge the submission of drawings missing in the PTO records.
- Applicants arguments filed 01/27/2009 have been fully considered and they overcome the rejections cited in the last office action, but they are moot in view of the new rejections cited below:

Claim Rejections - 35 USC § 102

Claim Rejections - 35 USC § 103

- The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

- The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

1. Claims 1-5, 7-17, 19-32, 34-36, 41-42, 44, 46-47, 49, 54-56, 58-60 and 85-87 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Xiong et al (Physica-C, 2000, V336, PP 70-74) (IDS).

Xiong et al teach a method of making a superconductor tape by providing a polished Haste-alloy substrate, depositing a biaxially textured and highly oriented CeO₂ buffer layer over the substrate and an epitaxial YBCO layer over the buffer layer. The layers were deposited by laser ablation of the target material in a modified PLD system. The angle between the plume and substrate normal was about 10° when ion beam incident angle is 55°, and 20° when incident angle was 45°. The buffer layer was deposited with or without simultaneous ion-bombardment, and all CeO₂ films deposited on polycrystalline Haste-alloy C substrates under ion bombardment were (002) oriented, no matter the substrate normal were tilted from plumes or not (Abstract; Pg-71; Cl-1; Para-1; Cl-2, Para-3; Pg-71-72; Experimental; Pg-73; Conclusion).

The CeO₂ layer was deposited to thickness of ~ 1.7 micron in 10 min at 550 ev ion accelerating energy, 800 μ A/cm² ion beam current density, 45° incident angle, and deposition rate of 2.8 nm/s. The FWHM of phi-scan peaks was about 10°. The ion beam incident plane was along 0°. The CeO₂ buffer layer grows with (200) plane aligned along the ion beam incident plane and oriented in (002) direction. The ion/atom arrival ratio in this experiment was about 1/5 (Pg-72; Sec 3).

The deposition flux incident plane being parallel to a direction along biaxially textured-film growth having fastest in-plane growth is anticipated over the fast growth of the film and small oblique angle between the plume and the substrate. With regard to the specific ranges in these claims, the prior art

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teaches examples wherein the corresponding values for the parameters lie inside the instant claimed ranges, and "[W]hen, as by a recitation of ranges or otherwise, a claim covers several compositions, the claim is anticipated' if one of them is in the prior art." <See MPEP 2131.03[R]>. The growth of CeO₂ buffer layer with fluorite phase and cubic crystal structure (rock-salt type) meets the limitation of cubic material with the fastest growth crystal axes in the claims. All the limitations of the instant claims are met.

The reference is anticipatory.

In the alternative that the disclosure by Xiong et al be insufficient to anticipate the instant claims, it would have been obvious to a person of ordinary skilled in the art to vary the angle between the substrate and the plume and/or target to attain high rate of forming biaxially textured buffer layer with high degree of orientation with reasonable expectation of success because the reference teaches each of the claimed ingredients within the structure and a method of making it including varying the process parameters.

2. Claims 6, 18, 33, 43, 45, 48, 57 and 61 are rejected under 35 U.S.C. 103(a) as obvious over Xiong et al (Physica-C, 2000, V336, PP 70-74).

The disclosure on the making of the buffer layer and the superconductor article as set forth in rejection-1 is herein incorporated.

The prior art is silent about the growth rates and fails to teach the operating parameters per the claims.

With regard to claims 6, 33 and 48, the prior art teaches a deposition rate of about 3 nm/sec (Abstract) that either touches or overlaps with the instant claimed above about 3 nm/sec and a prima facie case of obviousness exists In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" or are close enough that one skilled in the art would have expected them to have the same properties <MPEP 2144.05 [R-5]-I>.

With regard to claims-18, 45 and 57, the prior art discloses the biaxially aligned YSZ (rock salt) and MgO (rock-salt) buffer layers over metal substrates that are known in the art, and it would have been obvious to a person of ordinary skilled in the art to substitute CeO₂ buffer layer with MgO in the article of

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Xiong as functional equivalent with reasonable expectation of success, because they are cubic structured buffer materials for coated superconductors and “[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results MPEP 2141 [R-6]-I.

With regard to claim-43, the prior art teaches varying the angle between the plume flux and the substrate in attaining highly oriented biaxially textured buffer films in shorter deposition time, and it has been well settled these are result effective variables that can be optimized by a person of ordinary skilled in the art by routine experimentation. See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

With regard to claim-61, the prior art teaches a normal ion energy of 500-600 ev and further varying the deposition parameters in attaining shorter deposition time, and it has been well settled these are result effective variables that can be optimized by a person of ordinary skilled in the art by routine experimentation. See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the formation of an alloy).

3. Claims 37-40, 50-53 and 62-65 are rejected under 35 U.S.C. 103(a) as obvious over Xiong et al (Physica-C, 2000, V336, PP 70-74) in view of Schoop et al (US 6,537,689) (IDS).

The disclosure on the method of making the biaxially textured film and the superconductor article by Xiong et al as set forth in rejections -1 and 2 are herein incorporated.

The prior art fails to teach the formation of an intermediate layer and its characteristics per the claims.

In the analogous art, Schoop et al teach a multilayered superconducting article comprising YBCO/CeO₂/YSZ/Y₂O₃/Ni with a critical current density of 1.6 MegaAmperes/sq cm, and the benefits of the underlayer with high critical current density wherein one or more of the layers have high quality termination plane (CI-35, EX-XXXVIII; Abstract).

It would have been obvious to a person of ordinary skilled in the art to form a multiple buffer layers by incorporating the underlayers of YSZ/Y₂O₃ below CeO₂ buffer layer in the superconductor

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article of Xiong to benefit from improved current density with reasonable expectation of success because the teachings are in the analogous art and Xiong thrives for high critical density (Pg-73, Conclusion). The film thickness for intermediate/under-layer taught Schoop is in nanometer scale and the presence of nanometer scale grains in these films would be obvious. With regard to the lattice mismatch in the claims, the prior art composition and method of making the composition are either same or substantially same as the instant claims and expected possess similar characteristics.

4. Claims 66-84 and 88 are rejected under 35 U.S.C. 103(a) as obvious over Xiong et al (Physica-C, 2000, V336, PP 70-74) in view of Schoop et al (US 6,537,689) and Reade et al (US 6,821,338).

The disclosure on the method of making the biaxially textured buffer layer and the superconductor article by Xiong and Schoop as set forth in rejections 1-3 is herein incorporated.

The combined prior art fails to teach the biaxially textured films of non-cubic layer-structured material as a buffer layer.

In the analogous art Reade et al teach biaxially oriented layer formed by oblique particle beam comprising MgO, RuO₂, CeO₂ and YSZ (Abstract, Cl-6, Ln 11-30) and forming a superconductor article.

It would have been obvious to a person of ordinary skilled in the art to substitute the YSZ or CeO₂ layer in the article of Xiong and Schoop with RuO₂ of Reade et al as functional equivalent with predictable result and reasonable expectation of success because Reade teaches them to be equivalents and the teachings are in the analogous art of superconductor tapes. RuO₂ meets the limitation of non-cubic material in claims 66-67 and 74-75. With regard to characteristics in claims 66-67, the combined prior art composition and components processed therein are similar to that claimed by the applicants and they are expected to possess similar characteristics.

With regard to claims 68-73 and 76-80; the combined prior art teaches attaining higher deposition rate and optimizing the architecture of layers to attain higher J_c by varying the deposition parameters and the variable parameters are considered result effective variables in the process that can be optimized by a person of ordinary skilled in the art by routine experimentation. See also *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980) (prior art suggested proportional balancing to achieve desired results in the

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formation of an alloy). With regard to claims 79-80, Xiong teaches the use of air or oxygen in forming the oxide buffer layers with desired stoichiometry, and it would have obvious to a person of ordinary skilled to use the oxygen in forming the non-cubic oxide layer.

With regard to claims 81-84, the combined prior art teaches forming on underlayer of YSZ/Y2O3 with nanometer thickness, and the presence of nanometer scale grains in these nano-thick films would be obvious. With regard to the lattice mismatch in the claim-83, the prior art composition and method of making the composition are either same or substantially same as the instant claims and expected possess similar characteristics.

With regard to claim-88, the combined prior art teaches laser ablation and e-beam evaporation (Xiong et al: Pg-73; Conclusion).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KALLAMBELLA VIJAYAKUMAR whose telephone number is (571)272-1324. The examiner can normally be reached on M-F 07-3.30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 5712721358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/kmv/

May 13, 2009

/Stanley Silverman/

Supervisory Patent Examiner, Art Unit 1793